REMARKS

Applicants wish to thank Examiners Parries and Deberadinis for the courteous and helpful interview with Mr. Powell, Mr. Folts, and applicant's representative Mr. Occhiuti on February 7, 2008.

Claims 1, 3-11, and 13-22 are pending in this application, of which claims 1 and 10 are independent.

Claims 1 and 10 have been amended to recite the additional limitation "during normal operating conditions." Support for this amendment can be found, for example, in the Specification at page 7, lines 1-7.

35 U.S.C. § 103 Rejections

Independent claim 1

The Examiner rejected claims 1, 3, 5, 7, 16, and 18 as being unpatentable over Sinha (2003/0183410) in view of Morita (6,344,956). The Examiner acknowledges that Sinha fails to disclose a power flow controller (Office Action p. 2). However, the Examiner cites Morita as disclosing a power flow controller and argues that Morita's power flow controller selectively controls the magnitude of power flowing through a superconductor, where the controller could be a reactor. The Examiner further argues that it would have been obvious to modify Sinha's superconductor transmission line to include Morita's reactor in order to regulate the power flow through the line and to react quickly to short-circuit accidents.

We submit that neither Sinha nor Morita, separately or in any proper combination, describe or suggest a multi-line utility power transmission system comprising, among other features, a second power transmission line including a superconductor ... ; and a power flow controller, coupled to the second power transmission line, for selectively regulating during normal operating conditions of the power transmission system by a variable amount at least one of the magnitude and direction of the power flowing through the second power transmission line, as recited in claim 1.

Rather, Morita discloses a current-limiting device that "provide[s] a mechanism which promotes or generates quenching ... to accomplish transition of the current-

limiting element from a superconductive state to a normal conductive state. ... '[Q]uenching' refers to a sudden transition from superconduction to normal conduction" (Morita col. 2, lines 54-55, 60, and 66-67). Morita's transition from superconducting power flow to normal conductive power flow is *sudden* and changes the power by a fixed amount (col. 2, lines 66-67). Furthermore, Morita's current-limiting device does not operate during normal operating conditions; it operates under fault conditions, "at the point where the current value flowing through the current-limiting element exceeds a given value" (col. 7, lines 39-41). The current-limiting device operates as a fault current limiter which plays no role under normal operating conditions and reacts only upon detection of a fault: "[t]he magnetic field must be applied immediately after detection of abnormal current" (col. 5, lines 27-28). Nowhere does Morita describe or suggest that his current-limiting device can selectively regulate *during normal operating conditions* of the power transmission system *by a variable amount* the power flowing through a power transmission line including a superconductor, as recited in amended claim 1.

Even assuming arguendo that Morita's current-limiting device is a power flow controller (which we deny), we submit that there are further reasons for why a person of skill in the art would not have found it obvious to couple Morita's current-limiting device to the superconducting cable of Sinha's electric system.

Sinha's Fig. 29 discloses a superconducting transmission line extending between a substation and load as well as a non-superconducting overhead line in parallel with the superconducting transmission line. Applicant submits that such arrangements are typical since in most applications of a superconducting line a non-superconducting line is provided in parallel to serve as a bypass line in the event that the superconducting line fails or requires maintenance. In such arrangements and in normal operation, maximizing power flow through the superconducting line is generally desirable.

Thus, we submit that coupling a power flow controller to a second power transmission line including a superconductor (such as Sinha's superconducting cable), in parallel with a first power transmission line (such as Sinha's overhead line) is counterintuitive since doing so would decrease the level of power flow through the lower

impedance second power transmission line including a superconductor. Applicant was the first to appreciate that in such arrangements coupling a power flow controller to the second power transmission line including a superconductor had advantages. In particular, without a power flow controller, power would flow primarily through the lower impedance second power transmission line including the superconductor. Coupling a power flow controller to the second power transmission line would provide for the regulation of the power flowing through the second power transmission line, thus allowing the level of power flow in both the first and the second power transmission lines to be adjusted during normal operating conditions of the power transmission system. That is, a portion of the power could be forced to flow through the higher impedance first transmission line in order to achieve a certain amount of power flow through each power transmission line. Indeed, coupling a power flow controller to the second power transmission line including a superconductor provides "at least one of load balancing between the first power transmission line and the second power transmission line and flow optimization between the first power transmission line and the second power transmission line", as recited in claim 1.

In light of these advantages, we argue that it is not obvious to couple a power flow controller to a second power transmission line including a superconductor, in parallel with a first power transmission line, because such a configuration could be used to reduce the proportion of power flowing through the second power transmission line during normal operation. Thus, even if Morita's current-limiting device was a power flow controller, we submit that it would not have been obvious to couple it to the superconducting cable of Sinha's electric system.

For at least these reasons, we submit that claim 1 is patentable. Since claims 3, 5, 7, 16, and 18 depend from claim 1, these claims are also patentable for at least the same reasons claim 1 is patentable.

Independent claim 10

The Examiner rejected claims 10, 11, 13-14, and 17 as being unpatentable over Sinha in view of Morita and Hingorani (5,420,495). The Examiner acknowledges that Sinha fails to teach determining and regulating the level and amount of power flow through the second transmission line (Office Action p. 5). The Examiner argues that Morita teaches this feature with its current-limiting device.

We submit that none of Sinha, Morita, and Hingorani teach a method including, among other features, "selectively regulating during normal operating conditions of the power transmission system by a variable amount the power transferred through the second power transmission line", as recited in amended claim 10. As discussed above in conjunction with claim 1, we submit that Morita's current limiting device effects a sudden transition that changes the power flow by a fixed amount under fault conditions. Morita does not teach that its current limiting device selectively regulates during normal operating conditions of the power transmission system by a variable amount the power flow. Further, as discussed above, we submit that it would not have been obvious to couple Morita's current limiting device to the superconducting cable of Sinha's electric system.

For at least these reasons, we submit that claim 10 is patentable over Sinha, Morita, and Hingorani. Since claims 11, 13-14, and 17 depend from claim 10, these claims are also patentable for at least the same reason that claim 10 is patentable.

The Examiner rejected dependent claims 4, 6, 8-9, 15, and 19-22 as being unpatentable over Sinha and Morita and further in view of one or more of Talisa (5,878,334), Shimomura (JP 11122793A), Hingorani, Parton (4,045,823), and Couture. We submit however that none of these secondary and tertiary references disclose that which was missing from Sinha and Morita. For at least this reason, we submit that claims 4, 6, 8-9, 15, and 19-22 are patentable.

In an interview on February 7, 2007, the Examiner suggested that Couture (2002/0005668) discloses switching units that could be used with Sinha's transmission

system and Morita's current-limiting device. We argue however that Couture does not teach a power flow controller ... for selectively regulating during normal operating conditions of the power transmission system by a variable amount at least one of the magnitude and direction of the power flowing through the second power transmission line, as recited in claim 1. Instead, Couture discloses a system to balance power flow in a network through serial impedance modulation on a number of non-superconducting transmission lines in the network (Couture [0047]-[0048]). Thus, we submit that none of Sinha, Morita, and Couture, either alone or in any proper combination, teach the multi-line utility power transmission system recited in claim 1. In particular, we submit that Couture does not teach the power flow controller that Sinha fails to teach.

Conclusion

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Please apply any charges or credits to Deposit Account No. 50-4189, referencing Attorney Docket No. 30020-189001.

Respectfully submitted,

Date: March 11, 2008

Frank R. Occhiuti
Reg. No. 35,306

Customer No. 69713
Occhiuti Rohlicek & Tsao LLP
10 Fawcett Street
Cambridge, MA 02138
Telephone: (617) 500-2501
Facsimile: (617) 500-2499